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MEDICAL MICROSCOPY.

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Microscopy may be termed one of the eyes of Medical Science, valuable when rightly used and its revelations rightly interpreted. The novice sees the same objects that the skilled microscopist sees through his microscope but to the novice the characters seen are unintelligible hieroglyphics while to the microscopist these same hieroglyphics become an intelligible written language. Microscopy is only valuable to those whose eyes have been trained and prepared to differentiate objects found in the microscopic field, and a mind so educated along certain lines as to be able to resolve the impressions received into an intelligible language.

It is not enough to know that objects in the microscopic field stand out in bold relief to the eye, their outlines easily recognizable; they must also form a definite concept in the mind of the observer or nothing is gained practically to the observer or to the world.

From time almost immemorial it has been considered that abnormal conditions of the body were produced by morbid agents having at least a quasi-independent existence, whatever the morbid agents might be. Here, too, evolution has done its work, it has carried the medical profession along from the personal and unknowable "little devil" supposed to abide with man, to the tangible and recognizable bacillus which the microscope has now forced from its obscurity.

Though bacilli belong to the lower forms of organic life it cannot be said that they originate from nothing. It seems to be a well established fact that there is no such thing as "spontaneous generation" but that each living thing must produce

after its kind, and so far as we are able to study material forms this is absolutely true; but of the beginning of life, or life itself, outside of its physical manifestations, He who called it into existence has ever maintained an absolute silence and thus, for some wise reason, has He left humanity on this subject in intellectual darkness. What life actually is therefore must be left to individual surmises.

The germ theory of disease was promulgated long before the discovery of the disease producing bacillus, and over this theory many hard battles were fought before it become an accepted fact; so well is it now grounded that its verity scarcely admits of a question.

The microscope in medical science has indeed become a most valuable adjunct; it has pointed out the way from the field of fancy to the field of fact, it has made the hypothetical bacillus a veritable bacillus, it has by its revelations, in a measure at least, revolutionized the methods of the medical profession and the end is not yet.

If the known be indicative of the unknown, if the past be prophetic of the future, we are forced to the conclusion that all of those abnormal manifestations of the body which we term disease must be due to the presence of bacilli or rather of developing bacilli within their nidus or within some developing medium of the body. It is important also for the physician to understand not only how to search for the specific bacillus and recognize it full grown, but he should know equally well where its natural home is, what its method of reproduction and what elements are necessary to carry out its reproductive processes.

The process of development as observed in the macroscopic world clearly indicates that it is during this developing period that the growing being preys upon and is most destructive to other forms of life; this is markedly true in the insect world, it is the larva and not the imago that is destructive to organic life. The manner and mode of living of the larva differs widely from the imago towards which it is progressing and into which it will in due time reach its perfectness. What was

food for the larva in its developing stage becomes to the imago positively repugnant and unfit to sustain its life. What is here true in the macroscopic world is inferentially true in the microscopic world. The developing bacillus may require different surroundings and different dietetics from the fully developed bacillus; it may also be true that the fully developed bacillus is perfectly harmless unless it be aroused and its reproductive function brought into activity, which function it certainly has, and having such a function there must exist in or about it at least a germinal vesicle or spore in which the beginning of life takes place. Such a vesicle must exist though the eye hath not seen it; it is no proof that an object does not exist because it has not been discovered. Ultimate particles will in all probability remain theoretical ones and defy detection though their existence cannot be doubted.

It seems to be an established fact that protoplasm is the basis of all animated matter and in it began the first manifestations of that mysterious force known as life, the manifestation of which has developed physical man. There seems to be a unity in creation, and coming as it must from one Creative Mind, it could not consistently be otherwise.

What is so manifestly true in insect life must also be true, though not apparent, in every animate thing having prehensile and reproductive powers. The bacillus, coming as it does under this classification, must have a beginning in a germinal vesicle, a period of activity, of growth and development, ending in perfectness then giving its individual life to other germinal vesicles which it has developed and prepared to deposit in some developing menstrum to complete again another cycle.

That the home of the fully developed bacillus is not the home of the developing one, and that the conditions surrounding the former are markedly different from the conditions surrounding the latter are practically proven by recent investigations in the biological history of the typhoid bacillus and by the action of the antitoxic serums in the system.

It is true, as observation has proven, that the presence of fully developed pathogenic bacteria in or about the system

does not constitute disease even though located upon those membranes on which they are found when pathological processes exist. It is then confidently asserted that when these pathogenic bacteria enter some of the body-juices either as fully developed bacilli or as spores from them, and the process of reproduction begins, then, and then only, do we find the phenomena that are indicative of those abnormal processes that constitute disease.

One of the greatest needs of the medical profession of to-day is a more accurate knowledge of the *biology of bacteria*. On account of the difficulties that arise in methods and technique the busy physician is unable to enter upon and bring to a successful termination the necessary investigations; such investigations call for the services of an expert. For such services the medical profession as a body must appeal to the microbiologist and it is confidently hoped that such appeal shall not be in vain.